IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Yamashiro et al.

Serial No.: 10/508,901 Art Unit: 1711

Filed : April 13, 2005 Examiner: ACQUAH, SAMUEL A

Title : TONER BINDER FOR ELECTROPHOTOGRAP HY AND TONER FOR ELECTROPHOTOGRAPHY

## DECLARATION UNDER RULE 132

Honorable Commissioner of Patents and Trademarks,
Alexandria, Virginia 22313-1450

Sir:

I, Takashi Yamashiro, a citizen of Japan and having postal mailing address of c/o Sanyo Chemical Industries, Ltd., 11-1, Ikkyo Nomotocho, Higashiyama-ku, Kyoto-shi, Kyoto 605-0995 JAPAN, declare and say that:

March, 1999, I was graduated from Graduate School of Engineering, Hiroshima University, and received a Master Degree in chemistry;

From April, 1999, up till the present, I have been employed by Sanyo Chemical Industries, Ltd., and engaged in the works of research and development for organic polymers;

I am the inventor of the above-identified application and am familiar with the s ubject matter thereof;

I have read the Official Action mailed and the references cited therein and am familiar with the subject matter thereof;

I respectfully submit herewith my exact report

thereon;

In order to demonstrate that the toner bin der described in JP 3-41045 is poor in long-term running ability, I have carried out the following experiment under conditions similar to that of Example 1 and 4 of the instant specification except that composition containing BPA PO adduct obtained in Exam ple 3 in JP 3-41045 was employed in lieu of bisphenol A-PO (2 moles) adduct.

Referential Production Example 1
(conducted in the same manner as Example 3 of JP 3-41045)

An autoclave (inner capacity: 1 L) was charged with 300 g of BIS-A (bisphenol A), 200 g of water, and 4 g of NaOH (as a catalyst), and at a reaction temperature of 90.C, 153 g of PO (propylene oxide) was further added into the autoclave. After the lapse of two hours, 1.6 g of phosphoric acid was added into the reaction mixture for partial neutralization. PO (39 g) was further added into the mixture at 90.C, and reaction was continued for further 2 hours. Liquid separation was carried out at 90.C, to remove water. Then, 300 g of water was added to wash the resultant layer at 90.C for 1 hour. Liquid separation of the obtained mixture was carried out, and then water was removed off the mixture. Resultant was treated with activated clay and then filtered. Filtrate was then subjected to vacuum topping at 130.C for 2 hours, to give 440 g of a composition of the present invention.

Composition and analysis data of the obtained composition were shown as follows:

(Composition)

BIS-A 0.004 (% by weight) (=40 ppm)

| | |
|---|---|
| BIS-A PO 1-mole adduct | 0.009 |
| BIS-A PO 2-mole adduct | 98.5 |
| BIS-A PO 3-mole adduct | 1.3 |
| BIS-A PO 4-mole adduct | 0.05 |
| BIS-A PO 5-mole adduct | Not detected |
| $C_2$-$C_{40}$ Glycols | 0.15 |
| Isopropenyl phenol PO 1-mole adduct | 0.003 |
| Phenol PO 1-mole adduct | 0.002 |

(Analysis data)

| | |
|---|---|
| Appearance: | Clear viscous liquid |
| Color phase (Hazen method): | 10 |
| Water content (% by weight) | 0.05 |
| Alkaline value (mg KOH/g) | 3 |
| OH-V | 320 |

Experimental Example 1
(corresponding to Example 1 of the instant specification)

739 parts of the composition containing BPA-PO adducts produced in Referential Production Example 1, 176 parts of terephthalic acid, 78 parts of maleic anhydride and, as a condensation catalyst, 3 parts of dibutyltin oxide were charged in a reaction vessel equipped with a cooling column, a stirrer and a nitrogen inlet tube. The mixture was then subjected to reaction for 10 hours at 200°C under nitrogen flow while removing generated water. Subsequently, the mixture was further subjected to reaction under reduced pressure of 100 mmHg, and taken out when the softening point became 104°C to obtain a comparative polyester toner binder (HC-2).

The properties of (HC-2) were: acid value:2, hydroxyl value: 30, Tg: 65°C, Mn: 4400, Mw: 13000, BPA content: 28 ppm.

Experimental Example 2
(corresponding to Example 4 of the instant specification)

100 parts of the toner binder (HC-2), 4 parts of cyanine blue KRO (product of Sanyo Color Works, Ltd.) and 4 parts of carnauba wax (softening point 82°C) were mixed with melting by a twin-screw extruder (product of IKEGAI, Ltd. PCM-30). The kneaded product was cooled, coarsely ground, finely ground by using a supersonic jet mill Labo Jet (product of Nippon Pneumatic Mfg. Co., Ltd.), and classified by an airflow separator (product of Nippon Pneumatic Mfg. Co., Ltd. MDS-I) to obtain toner particles having the diameter D50 of about 9 .m. Then, 108 parts of the toner particles and 0.7 parts of a flowability providing agent (product of Nippon Aerosil Co., Ltd. Aerosil R972) were mixed (externally added) to obtain a toner (HT2). The toner (HT2) was evaluated in the same manner as the testing methods described in the instant specification, which are described below. The properties were shown in Table 1.

Table 1

| Toner No. | MFT (°C) | HOT (°C) | Toner fluidity | Long-term running ability | Content of bisphenol A (ppm) |
|---|---|---|---|---|---|
| (HT2) | 120 | 200 | Excellent | Fair | 26 |

(Testing methods in Experimental Example 2 )
(1) The minimum fixing temperature (MFT), hot offset occurrence temperature (HOT), and long-term running ability

A two-component developer for the test was prepared by uniformly mixing 30 parts of each toner and 800 parts of a ferrite carrier (product of Powdertech Co., Ltd., F-150).

Unfixed images developed on a commercial copier (AR 5030, product of Sharp Corp.) are fixed at a process speed of 80 mm/sec by a fixing machine prepared by modifying the fixing unit of a commercial full color printer (LBP 2160, product of Canon Inc.) so that hot roller temperature was variable. The hot roller temperature at which the residual image density after rubbing of the fixed image with a cloth pad amounted to at least 70% was recorded as the minimum fixing temperature (MFT). The temperature at which hot offset occurrence is recognized by the eye observation is recorded as the hot offset occurrence temperature (HOT). Furthermore, the long-term running ability was evaluated by visually observing the image unevenness (stains such as a black spot on the image, and hollow image dropout of a letter) when 50,000 sheets were copied using a test chart by using the above copier while supplying a toner.

| | |
|---|---|
| No image unevenness is observed | Excellent |
| Image unevenness is slightly observed | Fine |
| Image unevenness is observed to a degree that the image is slightly affected | Fair |
| Image unevenness is observed to a degree that the image is significantly affected | Poor |

(2) The toner fluidity

The aerated bulk density of each toner is measured with Powder Tester manufactured by Hosokawa Micron Corp., and the toner fluidity is determined based on the following standard. "Good" and better levels of toner fluidity are within a practical use range.

| Aerated bulk density | Toner fluidity |
|---|---|
| 36 g/100 ml or more : | Excellent |
| 33 to 36 : | Fine |

| | |
|---|---|
| 30 to 33 : | Good |
| 27 to 30 : | Fair |
| Less than 27 : | Poor |

RESULTS

By evaluating the toner binder and toner containing the tone binder based on the description of the cited document JP-3-41054 under the same test condition as the present invention, it was found that the toner or toner binder in the cited document cannot attain the effect of the present invention.

I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the v alidity of the application or any patent issued thereon.

Signed this 7 day of June , 2006

Takashi Yamashiro

Takashi Yamashiro